MULTIPLE ANTENNA PORTS FOR ELECTRONIC DEVICES

BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates generally to antennas as they are coupled to mobile electronic devices. More specifically, the present invention applies to user-selectable placement of an electronic device's antenna.

2. Related Applications

Personal portable electronics have become increasingly smaller in size while becoming more sophisticated in performance and complexity. One such ubiquitous portable device has commonly become known as the personal data assistant (PDA). The PDA has become widely acceptable because of its convenient form factor and its ability to store and organize a user's calendar, address book, and various other scheduling and note taking functions. While the size of PDAs continues to evolve, one such form factor is typically about the size of a standard shirt pocket.

Because of the size and increased capabilities of a PDA, it has become one of the electronic devices of choice to be carried by a user. Other such electronic devices, such as wireless-based devices, (e.g., cellular telephones, pagers) are also generally carried by a user. It is understandable that such interactive or two-way wireless devices provide addressable messaging platforms through which a user may interact in an untethered environment. However, traditional interactions with such wireless devices such as cellular telephones and pagers provide a very small bandwidth conduit through which limited information may pass. Furthermore, the traditional visual display presented to a user via a cellular telephone or numeric pager, has heretofore been largely alphanumeric in nature.

While the onset of the information age has wetted the appetite for the exchange of more complex and sophisticated information, traditional cellular and paging form factors have not been conducive to the presentment of such sophisticated data information, namely graphics. Therefore, a merging of technologies has become necessary in order to present such complex data information in a useable form-factor.

The merger of wireless technologies such as cellular and paging systems with a visual interactive display system of a portable nature, such as a PDA, is becoming increasingly more accepted and prevalent in the market place. It is known, that a PDA may interface with a cradle or other receiving device having wireless receiving and/or transmitting capability. Such combination devices traditionally provide a holster or cradle receiving device into which the PDA is placed and also through which the PDA interacts to exchange baseband data. The holster or cradle device thereafter modulates or demodulates the baseband signal as received from the PDA into a suitable spectrum for interacting with a wireless hosting system. It is also well know that an integrated version of the above combination is also available wherein the receiving or transmitting capability is integrated within the PDA to provide a simplified functioning platform. One such device presently available is the PalmPilot VII as manufactured and sold by 3COM Corporation. Other such devices are also known and sold by other manufactures.

While such devices have become integrated (i.e., the receiving or transmitting circuitry has been incorporated or integrated within the PDA), it should be appreciated that the additional functionality of receiving and transmitting radio waves over a wireless channel requires the addition of an antenna apparatus to the PDA. Such configurations to date result in an antenna that significantly protrudes from the PDA. Furthermore, such antennas have heretofore been fixed by the manufacture in a specific location which may present a cumbersome interference to some users as it protrudes from the PDA.

It should be appreciated also that with the ubiquitous nature of PDAs, such devices are generally tailored to be more ergonomic to the majority-handed (ie., right-handed) users. In such configurations, antennas may be fixed by the manufacturer on one side of the device or the other depending on the manufacturer's choice and not the user's preference.

Therefore, it would be an advancement in the art to provide an antenna configuration for use in a PDA device which does not protrude in a cumbersome manner from the PDA. Such an improvement would not distract from the generally sleek ergonomics of a PDA.

Furthermore, it would also be an advancement in the art to provide an antenna interface for PDAs that allows the user to select a preferred placement of the antenna instead of a take-it-or-leave-it attachment as dictated by a PDA manufacturer.

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

It is an object of the present invention to provide a flexible configuration for accommodating the relocation or configuration of an antenna for use in a wireless transceiver device such as a PDA.

It is another object of the invention to provide a flexible configuration to enable a user to relocate the antenna in a more convenient location such as to be either more convenient or less intrusive to the user.

It is a further object of the invention to provide a flexible user-selectable configuration wherein the user may relocate the antenna of a wireless transceiver device in accordance with the user's preference as dictated by the user's preference such as the user's dominant hand (i e., right handedness verses left handedness).

An apparatus for accommodating a user-selectable placement of an antenna for use in a wireless communication device, such as a personal data assistant device, is presented. The apparatus of the present invention comprises a user-removable antenna having a first end for indirectly coupling with a transceiver of the wireless device and, in the preferred embodiment, a second end for extending at least partially outside the wireless personal data system for facilitating the user-selectable placement of the user-removable antenna. The apparatus further comprises a plurality of receiving channels or slots within or at least partially within the personal data assistant for receiving therein a user-removable or relocatable antenna, as well as other user devices such as a stylus.

In order to facilitate the electrical connection between the wireless transceiver device's transceiver and the antenna, a plurality of electrically symmetrical transmission lines is also provided. Such transmission lines originate at the transmitter and have electrically compatible transmission line lengths to facilitate the propagation of the desirable electromagnetic wave from the transmitter to the receiving channel having the antenna received therein. The other transmission lines that are not coupled to the antenna are of such an electrical transmission line length to not induce